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**POST-LAB REPORT #10**

**KINETICS II: DETERMINATION OF ACTIVATION ENERGY**

*1. Show calculation with units, for one of the temperatures of part B, of:*

Temperature range = **5 – 10** Mean temperature = **8.5** T (K) = 8.5 + 273.15 = **281.65 K**

*a. 1/T* = = 0.0035505 = **0.003551**

b. k″ = – Mean slope value = – (– 0.888415) = 0.888415 = **0.888**

c. lnk″ = ln(0.888415) = – 0.118316 = **– 0.118**

*2. Be sure to attach your Excel graph from part B to this postlab document. Show calculation with units of  using information from your graph.*

Trendline slope = 3521.02 K = **3.52 x K**

Activation energy of reaction = – (slope)(R) = – (3521.02 K)(8.314 )() = – 29.274 = **– 29.3**

*3. An often-used rule of thumb is that a 10°C increase in reaction temperature increases the reaction rate by two or three times. Is this the case for the decolorization of ? Show your work using two of the temperatures from part B that differ by about 10°C.*

1st Temperature range = **25 – 30** Mean temperature = **29.3**

k″ = – Mean slope value = – (– 0.110749) = 0.110749 = **0.111**

2nd Temperature range = **35 – 40** Mean temperature = **41.5**

k″ = – Mean slope value = – (– 0.64862) = 0.64862 = **0.649**

Temperature difference = 41.5 – 29.3 = 12.2 **~ 10**

For 10°C rise in temperature, the ratio of rate constant = = 5.86 ~ **6**

As reaction rate = k where [A] = concentration of reactant, n = order of reaction with respect to A, reaction rate is directly proportional to the rate constant k. However, this is not the case for the decolorization of as the calculated reaction rate increases by 6 times. This might be affected by the large temperature difference over 10°C and the 2nd mean temperature out of temperature range.